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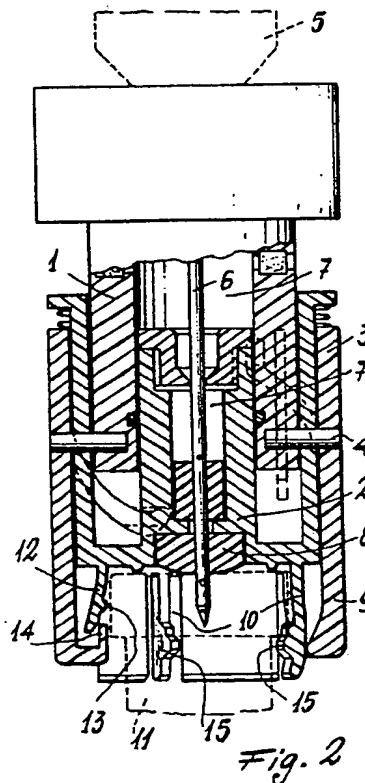
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54 Apparatus with safety locking members, for connecting a syringe to a bottle containing a medicament.

57 The invention relates to an apparatus for connecting a bottle containing a medicament to a syringe the needle of which is housed in a closed chamber defined by the apparatus and from which the needle can be made to emerge by sliding the separate constituent parts of the apparatus along each other. To prevent the needle emerging from said chamber when no bottle is housed in the appropriate seat provided in the apparatus, there extends from one of the parts of the apparatus an elongated flexible appendix having at least one protuberance which projects into said seat and against which the bottle presses when inserted into the seat, so bending the appendix outwards. In front of the free end of the appendix there is provided a stop tooth projecting from that constituent part of the apparatus which is mobile along the first stated part and extends totally around said seat. When no bottle is inserted into the seat in the apparatus it is impossible to move the various parts of the apparatus along each other because the free end of the flexible appendix makes contact with and halts against said stop tooth, to thus prevent the needle emerging from said chamber.



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APPARATUS WITH SAFETY LOCKING MEMBERS, FOR CONNECTING A SYRINGE TO A BOTTLE CONTAINING A MEDICAMENT

The invention relates to an improvement in apparatus for connecting a bottle containing a medicament to a syringe used to withdraw the medicament from the bottle, possibly after feeding into this latter a solvent or the like.

More specifically, the said apparatus is of the type described in USA patent No. 4,576,211. It comprises several mutually mobile constituent parts and at one end contains a seat into which the end of a syringe can be fitted so that its needle extends into a closed chamber bounded by the apparatus which, at its other end, comprises a seat for housing the mouth of a bottle containing a medicament. The various constituent parts of the apparatus can move axially along each other to securely lock the bottle mouth in its seat by means of retention teeth projecting from flexible tongues, and to cause the point and a portion of the needle to emerge from its chamber so that the needle can perforate the elastic plug fitted to the bottle opening and penetrate into the bottle, to be able to inject into it any liquid contained in the syringe or to draw into the syringe the liquid contained in the bottle.

While the bottle is connected to the apparatus the needle is always contained within the apparatus chamber or (partly) within the bottle, ie the needle is never freely exposed and accessible from the outside.

The apparatus of USA patent 4,576,211 has however the drawback that if no bottle is inserted into its seat in the apparatus, this can still be erroneously or accidentally operated in the sense of moving the various component parts along each other to cause the needle to emerge from its protection chamber. In such a case the needle would project outwards from the apparatus and be accessible from the outside, with consequent danger in terms of loss of needle sterility and even greater danger if a high-risk medicament such as an antitumoral drug has already been drawn into the syringe.

The object of the present invention is therefore to obviate the aforesaid drawbacks, ie to prevent the various constituent parts of the apparatus being able to move along each other when no bottle mouth (or the like) is inserted into its seat in the apparatus, to thus prevent the needle emerging from the closed chamber provided in the apparatus.

This is attained by an apparatus comprising several constituent parts and having at one end a first seat for housing the end of a syringe the

needle of which extends into a closed chamber in said apparatus, at the other end of which there is provided a second seat for housing the mouth of a bottle or the like, said constituent parts being mobile along each other between a travel stop at which the needle is entirely housed within said chamber and a travel stop at which the free end of the needle and a portion thereof emerge from said chamber to extend through a perforable plug and into said second seat, the apparatus being characterised in that from one of said constituent parts there extends a flexible appendix comprising at least one protuberance projecting into said second seat, another of said constituent parts being provided with a stop tooth positioned in front, and in the immediate vicinity, of the free end of said flexible appendix when in its rest position.

The structure and characteristics of the apparatus will be more apparent from the description given hereinafter by way of non-limiting example with reference to the accompanying drawing, in which:

Figure 1 is a partly sectional view of the apparatus in its rest state, with the needle completely retracted into the closed chamber of the apparatus;

Figure 2 shows the same apparatus connected to a bottle mouth and with the syringe needle projecting from the closed chamber and extending into the bottle; and

Figure 3 shows only an end portion of the apparatus in the state shown in Figure 2, but with a bottle neck of different thickness from that shown in Figure 2.

The apparatus shown on the drawing comprises three separate main constituent parts, namely the parts 1, 2 and 3. Pins 4 are rigid with one of these parts and extend radially into axially extending grooves formed in the other two parts. In this manner the three parts 1, 2 and 3 are coupled to each other but can be moved axially along each other.

The part 1 comprises a seat (not shown) to house and retain the free end of a syringe 5. With the said part 1 there is rigid a needle 6 which when the apparatus is in use is securely connected to the syringe inlet and outlet hole.

When the apparatus is in its rest state, ie not in use (Figure 1), the needle 6 is completely enclosed and protected within a chamber 7 defined by the parts 1 and 2. At its lower end, below the needle point, it comprises a hole hermetically sealed by a perforable plug 8 of rubber or a similar material.

The part 3 extends downwards from the apparatus (with reference to the figures of the drawing) beyond the part 2 in the form of a shaped continuous tubular wall 9 which has its free end enlarged in an inward direction and into which from the lower end of the part 2 there extend the flexible retention elements 10, the outer surface of which is such as not to interfere with the free edge of the wall 9 when the parts 1, 2 and 3 are superposed on each other to their maximum extent (Figure 2), provided that said appendices are free, ie provided no bottle is connected to the described apparatus.

In this respect, the retention elements 10 define a housing seat in which the mouth of a bottle 11 for containing medicaments can be inserted and retained. In Figure 1 no bottle is inserted in its housing seat, the apparatus is in its rest state and the elements 10 can bend both inwards and outwards. Under these conditions (Figure 1), if the mouth of a bottle 11 is inserted into the seat defined by the elements 10 these are bent freely outwards by the bottle neck, which interferes with the protuberances projecting from these elements. When the bottle 11 has been inserted into its seat in the described manner, the parts 1, 2 and 3 can be moved along each other (Figure 2) so that the free edge of the wall 9 rests against the outer surface of the elements 10, which can therefore not bend further outwards. The result is that when in this position the protuberances projecting inwards from the elements 10 are locked under the neck of the bottle, which can therefore not be removed from the apparatus. It will be noted that when the apparatus is in the position shown in Figure 1, the needle is completely housed within the chamber 7, whereas when in the position shown in Figure 2 the needle has passed through the plug and extends into the bottle 11.

The apparatus described up to this point is of well known type, and is illustrated in USA patent No. 4,576,211. This apparatus has considerable merit, but has the drawback that if no bottle is inserted between the elements 10, the parts 1, 2 and 3 can still be moved freely along each other to cause the needle to emerge from the closed chamber of the apparatus. The point of the needle and a portion thereof are therefore exposed and freely extending outside the apparatus, a situation which can be very dangerous if the syringe is filled with a potentially toxic medicament, such as an anti-tumoural drug.

To prevent this happening, ie to allow the needle point to pass beyond the plug 8 only when the mouth of a bottle 11 is inserted between the retention elements 10, according to the present invention there projects from the lower end of the part 2 at least one flexible appendix 12 having a protuberance 13 projecting towards the seat defined by the

inner surfaces of the retention elements 10. The free end of a tooth 14 which projects upwards from the edge of the wall 9 of the part 3 is positioned in front of the free end of the appendix 12 (when in the rest state of Figure 1).

Assuming that the conditions of Figure 1 apply, if an attempt is made to slide the parts 1, 2, 3 along each other, the free end of the appendix 12 makes contact with the free end of the tooth 14 to prevent any further sliding of the parts along each other, and thus prevent the needle 6 emerging from the plug 8.

It will again be assumed that the rest conditions of Figure 1 apply, but that the mouth of a bottle 11 is now inserted into the seat defined by the flexible elements 10. As the bottle mouth is inserted into said seat, the mouth firstly acts against the protuberances 15 projecting from the elements 10 (so urging these latter outwards), and then acts against the protuberance 13, so bending the appendix 12 outwards. Under these conditions, the parts 1, 2, 3 can be freely slid along each other (and the needle can perforate and project below the plug 8) because the appendix 12 is in an outwardly bent state and its free end no longer comes into contact with the stop tooth 14. Thus the presence of the appendix 12 with its protuberance 13 and the presence and positioning of the stop tooth 14 ensure that the needle 6 can be made to project below the plug 8 (and thus be freely extending and accessible from the outside) only when a medicament bottle mouth or an object reproducing the shape of such a bottle mouth is housed between the flexible elements 10.

It should be noted that when in the state shown in Figure 2, the protuberances 15 are positioned below the lower edge (relative to the figures) of the mouth of the bottle 11, so preventing its removal from the apparatus as the elements 10 now rest against the free edge of the wall 9 and cannot therefore bend outwards.

The present invention also incorporates the following further characteristic. As stated, when in the state shown in Figure 2, the protuberances 15 hook onto and securely retain a bottle mouth.

Most bottles have a mouth with a projecting neck of constant defined height or thickness. There are however bottles with necks of a different height, for example greater than that of the bottle shown by dashed lines in Figure 2.

In the apparatus described in USA patent No. 4,576,211 the flexible elements 10 are provided with protuberances able to hook only onto bottles having necks of a defined constant height.

As can be seen from the drawings accompanying this description, the protuberances 15 are shaped stepwise with the tallest or most projecting step positioned at the free end of the elements 10.

In this manner, when the bottle neck is of smaller height, it is hooked by a shorter step on the protuberances 15 (Figure 2), whereas if the bottle neck is of greater height (Figure 3) it is hooked by a taller step on said protuberances.

The apparatus is therefore more versatile than the known type and can be used with bottles of different structure.

Claims

1. An apparatus with safety locking members, for connecting a syringe to a bottle containing a medicament, said apparatus comprising several constituent parts and having at one end a first seat for housing the end of a syringe the needle of which extends into a closed chamber in said apparatus, at the other end of which there is provided a second seat for housing the mouth of a bottle or the like, said constituent parts being mobile along each other between a travel stop at which the needle is entirely housed within said chamber and a travel stop at which the free end of the needle and a portion thereof emerge from said chamber to extend through a perforable plug and into said second seat, the apparatus being characterised in that from one of said constituent parts there extends a flexible appendix comprising at least one protuberance projecting into said second seat, another of said constituent parts being provided with a stop tooth positioned in front, and in the immediate vicinity, of the free end of said flexible appendix when in its rest position.

2. An apparatus as claimed in claim 1, in which said second seat for housing the mouth of a bottle is at least partly defined by flexible elements projecting from one of said constituent parts towards the opening of said seat, and in which from another of said parts there projects a tubular wall the free edge of which is substantially aligned with the outer surface of said flexible elements, characterised in that from each of said flexible elements there inwardly projects a step-shaped protuberance, the step of greatest height or thickness being closer to the end of the relative flexible element than the other steps.

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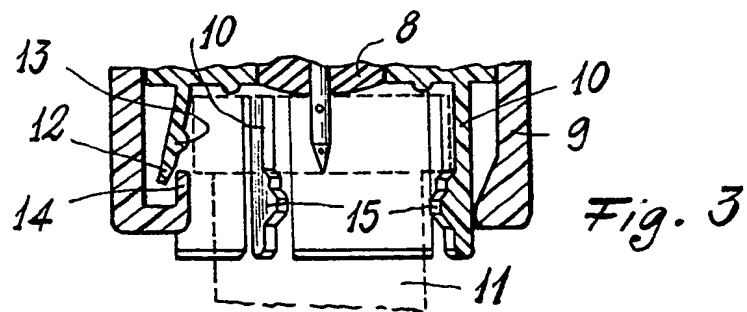
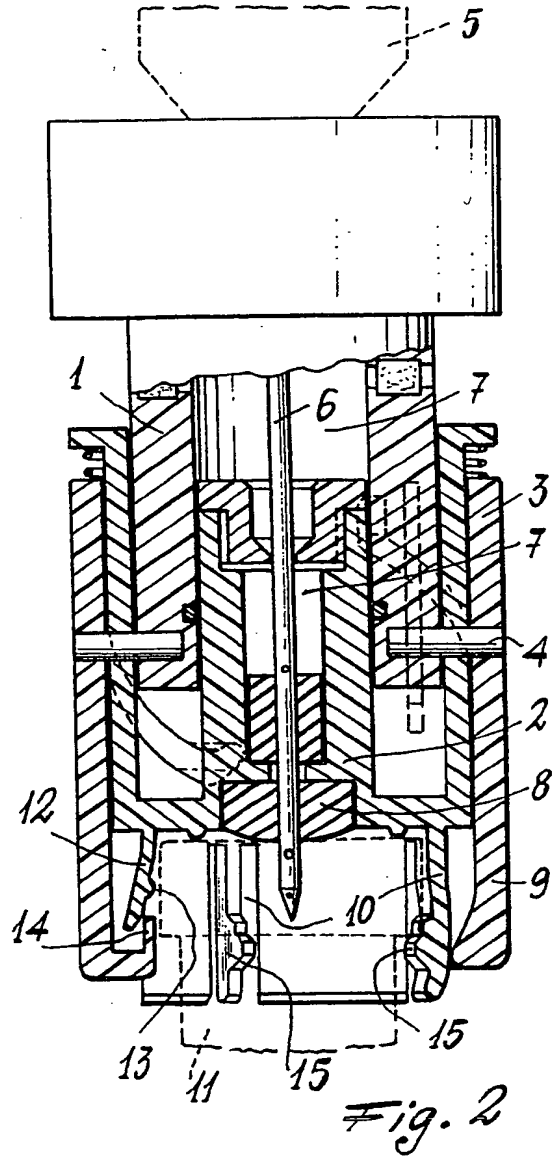
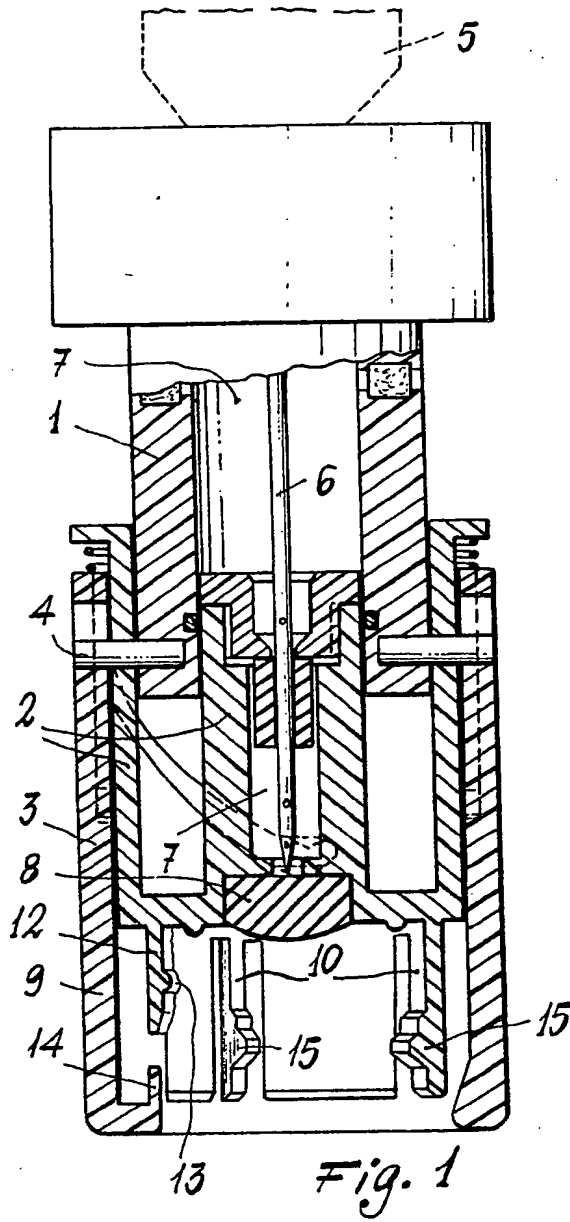
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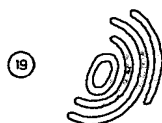
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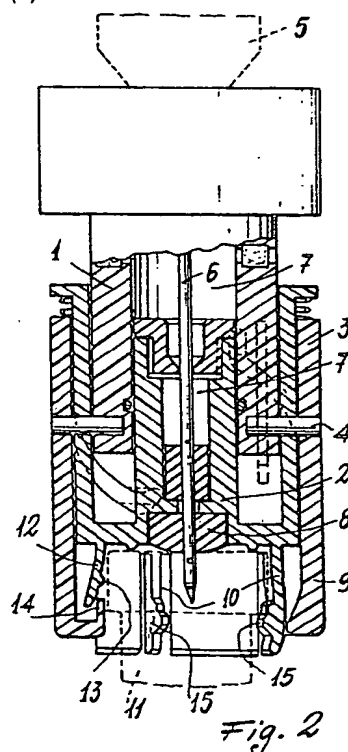
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Apparatus with safety locking members, for connecting a syringe to a bottle containing a medicament.

The invention relates to an apparatus for connecting a bottle (11) containing a medicament to a syringe (5) the needle (6) of which is housed in a closed chamber (7) defined by the apparatus and from which the needle (6) can be made to emerge by sliding the separate constituent parts (1, 2, 3) of the apparatus along each other. To prevent the needle (6) emerging from said chamber (7) when no bottle (11) is housed in the appropriate seat provided in the apparatus, there extends from one of the parts (1, 2, 3) of the apparatus an elongated flexible appendix (12) having at least one protuberance (13) which projects into said seat and against which the bottle (11) presses when inserted into the seat, so bending the appendix (12) outwards. In front of the free end of the appendix (12) there is provided a stop tooth (14) projecting from that constituent part (3) of the apparatus which is mobile along the first stated part (1) and extends totally around said seat. When no bottle (11) is inserted into the seat in the apparatus it is impossible to move the various parts (1, 2, 3) of the apparatus along each other because the free end of the flexible appendix (12) makes contact with and halts against said stop tooth (14), to thus prevent the needle (6) emerging from said

chamber (7).





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EUROPEAN SEARCH REPORT

Application Number

EP 88 11 4726

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
D,A	FR-A-2 560 049 (FARMITALIA CARLO ERBA S.p.A.) * Whole document *	1,2	A 61 J 1/00
A	CH-A- 581 273 (M. PASBRIG) * Figures 1-3 *	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			A 61 J A 61 M B 65 D B 67 D F 16 L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04-07-1989	Examiner GODOT T.G.L.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			